Deer Park, Texas- Preliminary Results and Observations – Including ^{7}Be Results

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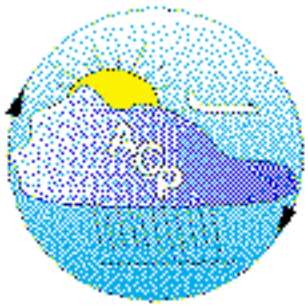


Presented in this oral presentation were examples of data obtained from the Deer Park, Texas Field Site as part of Texas 2000 Air Quality Study held in August-September of 2000.

Note to the Atmospheric Science Program Modelers:

Field Data Sets can also be obtained from this project for the following studies, sites, and time periods:

Northeast Oxidant and Particle Study – NEOPS – Centerton, N.J.
Summer 1999 – data taken include ozone, nitrogen dioxide, PAN, UV-B, NOx, Nephelometry, SODAR/RASS (R. Coulter, ANL, EMP), as well as ^{210}Pb/^{210}Bi/^{210}Po data taken on week long samples.

Salt Lake, City – VTMX study – October 2000 at the Golf Course Site (ANL) near the outflow of Little Cottonwood Canyon – data taken include ozone, nitrogen dioxide, PAN, UV-B, NOx, CO, Nephelometry, Ground Meteorology and SODAR/RASS (R. Coulter, ANL, EMP). Note also collected some golf balls from driving range!

CASES 1999 - Atmospheric Boundary Layer Experiment – Ozone, UV-B, NOx

Phoenix 1998 – Paper submitted to Atmospheric Environment – data available for ozone, nitrogen dioxide, PAN, UV-B as well as ADEQ data.

Houston, Texas Air Quality Problem Overview as it Related to Potential Industrial Chlorine Release:

Chlorine Problem noted in a number of major urban centers from industrial releases. See ES&T, 34, 4470-4473 (2000) by D. Allen, Univ. of Texas and co-workers.

Lot of emissions of molecular chlorine in the Deer Park, La Porte areas near the ship channel from industry.

Cl_2 will photolyze in the visible to form Cl radicals with about a 10 min. photolysis time. With light winds this means that the Cl radical effects will be very localized near the sources (a few miles).

Cl radicals will react with ALKANES via Abstraction much faster than OH radicals making compounds like ethane, propane, butane, etc. react near the Chlorine release. The reaction will form peroxy radicals and HCl. RO_2 radicals will react with NO to form NO_2 and RO radicals, etc. thus increasing local ozone production rates.

Reaction rates for this initiation of alkanes from Chlorine are orders of magnitude faster than OH. HCl will be in fine aerosols. Ozone production rates will appear to be higher than predicted by the hydrocarbon reactivities for OH – particularly for alkanes.

Depending upon temperature, and NO/NO_2, it is possible that PAN levels may be higher as well.

Deer Park, Texas – Texas 2000 Air Quality Study – August 11, 2000 to Sept. 14, 2000

ANL – Trailer parked at Site 35 – Deer Park – co-located at TNRCC station.

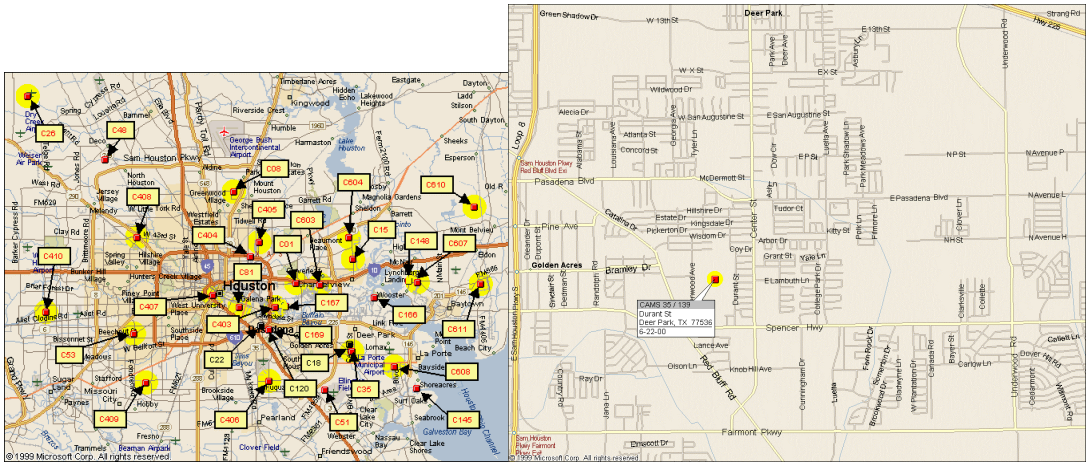
Ozone, Nitrogen Dioxide, PAN, UV-B, NOx, CO, Multi-Filter Rotating Shadowband Radiometer (MFRSR), Nephelometry, Meteorological Data (WS, WD, RH, T) – week long size fractionated aerosol samples for X-ray analysis (M. Schmeling, Loyola of Chicago) and ^{210}Pb/^{210}Bi/^{210}Po determinations.

As well, 12 hour samples of 2.5 micron aerosols were taken for ^{7}Be determinations using gamma counting and were sent to Baylor University for validation of their methodology for evaluation of stratospheric air incursions using this as a tracer.

Paul Doskey (ANL) also obtained VOC canister samples during a couple of days that were taken on an hourly basis to evaluate the VOC levels.

TNRCC site measured CO, NOy, NO, NO_2 (likely NO_2*), NOx, ozone (all previous are hourly averages. PM-2.5 (local conditions) and Meteorological parameters: WS, WD, Resultant WS, Resultant WD, Max. Wind Gust, Std. Dev. Of Hor. WD, Outdoor T, Dew Point T, RH, Solar Radiation. Measurements at the site were also planned for VOC and Aldehydes –(note. we are not sure at this time of the status of those measurements).

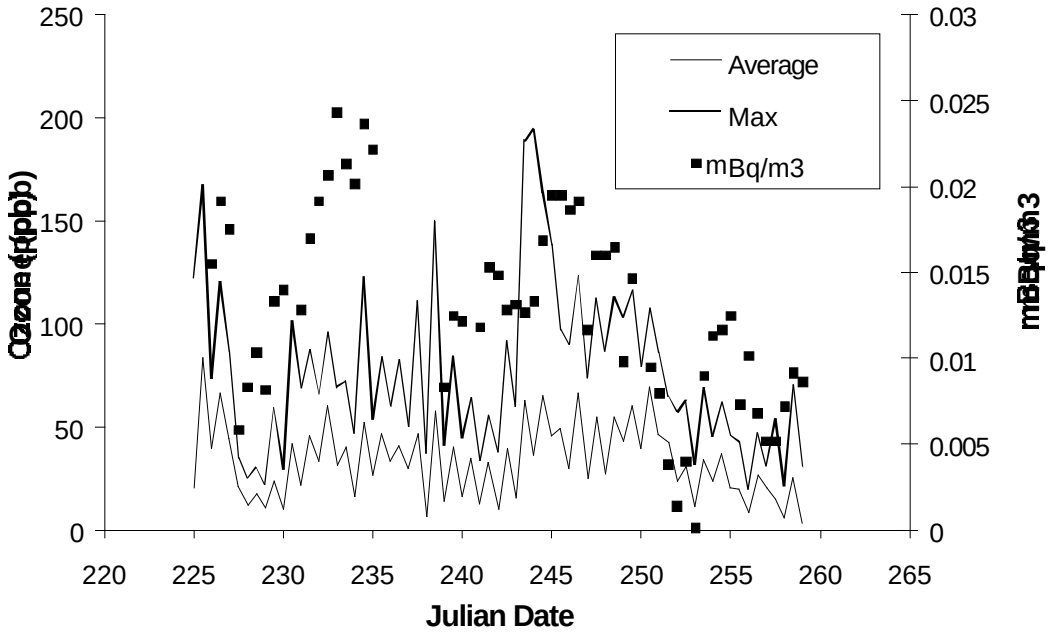
Maps showing site 35. Deer Park Location.

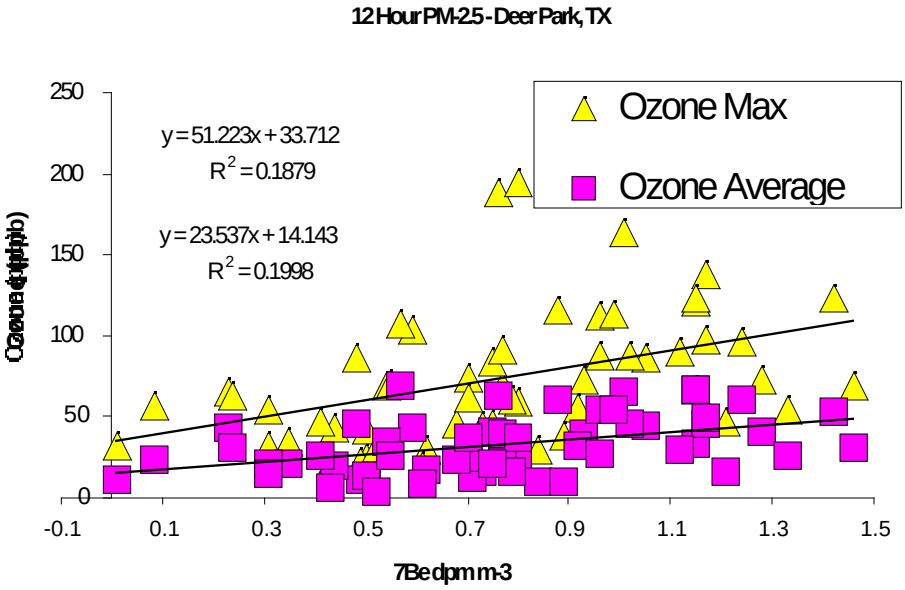


DEER PARK, TEXAS – TEXAS 2000 Air Quality Study.

Photographs showing 7Be counting system at ANL used for gamma counting, and new Fast GC Luminol Analyzer used at Deer Park. New luminol system can determine nitrogen dioxide and PAN at 30 second response time.

Figure 1. Comparison of O3 ave., O3 max., and 7Be activity





Data from 12 Hour particulate sampling for 7Be from Deer Park, TX